PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ECIPA034WO	FOR FURTHER ACTION	See Form PCT/PEA/416

International application No. PCT/IL2004/000585	International filing date (day/month/year) 01.07.2004	Priority date (day/month/year) 15.07.2003

International Patent Classification (IPC) or national classification and IPC

H04L12/56

Applicant

ECI TELECOM LTD. et al.

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising: _

    a. ☒ sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:

        ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

        ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

    b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

    ☒ Box No. I   Basis of the opinion

    ☐ Box No. II   Priority

    ☐ Box No. III   Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

    ☐ Box No. IV   Lack of unity of invention

    ☒ Box No. V   Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

    ☐ Box No. VI   Certain documents cited

    ☒ Box No. VII   Certain defects in the international application

    ☐ Box No. VIII   Certain observations on the international application

Date of submission of the demand 07.02.2005	Date of completion of this report 22.07.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Mircescu, A Telephone No. +49 89 2399-7645

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/IL2004/000585

Box No. I. Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:

       ☐ international search (under Rules 12.3 and 23.1(b))
       ☐ publication of the international application (under Rule 12.4)
       ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

   Description, Pages

1-22	as originally filed
3a	received on 12.02.2005 with letter of 07.02.2005

   Claims, Numbers

3-12, 17-25	as originally filed
1, 2, 13-16	received on 12.02.2005 with letter of 07.02.2005

   Drawings, Sheets

1/5-5/5	as originally filed

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
       ☐ the description, pages
       ☐ the claims, Nos.
       ☐ the drawings, sheets/figs
       ☐ the sequence listing *(specify)*:
       ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
       ☐ the description, pages
       ☐ the claims, Nos.
       ☐ the drawings, sheets/figs
       ☐ the sequence listing *(specify)*:
       ☐ any table(s) related to sequence listing *(specify)*:

   * *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. V   Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

   Novelty (N)   Yes: Claims   1-25
                                  No: Claims

   Inventive step (IS)   Yes: Claims   1-25
                                  No: Claims

   Industrial applicability (IA) Yes: Claims   1-25
                                  No: Claims

2. Citations and explanations (Rule 70.7):

   see separate sheet

Box No. VII   Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

A. Explanations with respect to Item V

Following document is referenced to:

D1: US-A-5 999 518 (NATTKEMPER DIETER H ET AL) 7 December 1999 (1999-12-07)

Remark: The subject matter of claim 1 is new (Art 33(2) PCT) and inventive (Art 33(3) PCT) with respect to the prior art given by D1. But since the subject matter of claim 1 does not comprise all essential features of the invention as understood by the examiner, the subject matter contravenes Art 6 PCT (see also point B.1 below). After the implementation of the essential features of the invention in claim 1, the subject matter of claim 1 is identical to the subject matter of claim 16. It appears therefore appropriate to discuss only the novelty (Art 33(2) PCT) and inventive step (Art 33(3) PCT) of claim 16 in a detailed manner and to briefly indicate that the subject matter of claim 1 is new (Art 33(2) PCT) and inventive (Art 33(3) PCT) with respect to the prior art given by D1 for the same reasons as the subject matter of claim 16 but that the subject matter of claim 1 contravenes Art 6 PCT at the same time.

1.1 The invention is defined by a method (claim 16) of (a)-"packet discard at a network node at a Virtual Path (VP)-layer from Asynchronous Transfer Mode (ATM)-traffic comprising packets of ATM Adaptation Layer 5 (AAL5) type composed of ATM cells" comprising the steps of (b)-"monitoring cells and determining Virtual Channel (VC) layer and VP layer parameters" (c)-"of the cell being monitored", (d)-"registering the information of (b) and (c) in a database", (e)-"detecting a congestion event during the monitoring process of (b)", (f)-"analysing information in the database whether a particular VC connection (VCC) associated with a particular VP connection (VPP) is suitable for discarding", (g)(α)-"if yes, discarding cells of the VCC according to a selected discard policy", (g)(β)-"if not, performing the mechanism with respect to a new incoming cell".

1.2 The closest prior art is given by D1 which is describing a method of packet discard at a VP or a VC layer from ATM traffic comprising packets of AAL5 type. At the VC layer the discard policy operates on a cell level. At the VP layer the discard policy is not

taking account of any information about the underlying VC layer. Therefore also in the case that the system of D1 operates on the VP layer the discard policy still operates on a cell level, irrespectively to the relationship between the discarded cells and the AAL5 packets.

1.3 The difference between the present invention as defined by claim 16 and the prior art as defined by D1 is given by the features (c), (d), (f), (g)(α), and (g)(β). The novelty (Art 33(2) PCT) of the subject matter of claim 16 follows then a fortiori.

The novelty (Art 33(2) PCT) of the subject matter of claim 1 follows then from the Remark above and from the novelty (Art 33(2) PCT) of the subject matter of claim 16. The novelty (Art 33(2) PCT) of the subject matter of dependent claims 2-15 and 17-21 follows then a fortiori. The novelty (Art 33(2) PCT) of the subject matter of independent claims 22, 23, and 24 follows then also a fortiori. The novelty (Art 33(2) PCT) of the subject matter of dependent claim 25 follows from the novelty (Art 33(2) PCT) of the subject matter of claim 24.

1.4 The objective problem (ם) to be solved by the present invention is the (ם)-"optimization of the cell discarding mechanism during a congestion in ATM systems operating at the VP layer".

1.5 (ם) is solved by features (c), (d), (f), (g)(α), and (g)(β) since they allow an ATM node operating at the VP layer to gain information regarding to the VC layer by monitoring the indexes of the VP and VC connection of each arriving cell to obtain data on the cells belonging to different VC connections that are multiplexed in each VP connection. Based on this information the present invention allows the discarding of cells taking into account whether the particular VCC associated with the particular VPC is suitable for discarding. Thus, contrary to the prior art given by D1, the present invention allows to select which cells can be discarded in case of congestion, such that the impact of the discard policy is minimized according to the rules set in (f) and in (g)(α). This clearly provides a solution to the objective problem (ם). Since there is no unique solution to the objective problem (ם) and since this existing solution is not derivable in a direct, unique and complete manner from the prior art given by D1, the inventive step (Art 33(3) PCT) of the subject matter of claim 16 follows a fortiori.

The inventive step (Art 33(3) PCT) of the subject matter of claim 1 follows then from the Remark above and from the inventive step (Art 33(3) PCT) of the subject matter of claim 16. The inventive step (Art 33(3) PCT) of the subject matter of dependent claims 2-15 and 17-21 follows then a fortiori. The inventive step (Art 33(3) PCT) of the subject matter of independent claims 22, 23, and 24 follows then also a fortiori. The inventive step (Art 33(3) PCT) of the subject matter of dependent claim 25 follows from the inventive step (Art 33(3) PCT) of the subject matter of claim 24.

1.6 Since the methods of claims 1-21, the computer software product of claim 22, the storage device carrying a computer software product of claim 23, and the apparatuses of claims 24 and 25 all perform technical steps which are operating on commercially available components for processing, transmitting and storing information the subject matter of said claims is a fortiori industrially applicable (Art 33(4) EPC).

B. Explanations with respect to Item VII

1. The subject matter of claim 1 does not comply to Art 6 PCT since it does not comprise all essential features of the invention. Claim 1 defines a "method for handling ATM traffic" which comprises features (a)-(d) of claim 16 (see also point A.1.1 above). Features (a)-(d) describe, however, merely the monitoring of cells and registering of cell related information but not which actions are performed, based on this information. The specification of the performed actions is, however, necessary in order to define the handling of ATM traffic, as mentioned in claim 1.

   When features (a)-(d) are complemented by the actions which are to be performed in order to define the handling of the ATM traffic one then arrives exactly at the subject matter of claim 16 since features (e), (f), (g)(α), and (g)(β) are disclosed in the description on pages 11 and 12 as the actions which this invention discloses in order to solve the problem of handling ATM traffic.

2. Based on the reasoning of 1 above claims 1 and 16 contravene Art 6 PCT due to lack of conciseness since these two independent claims define the same subject matter.

3. The attention of the applicant is drawn also to the following matters, which should as well have been considered.

3.1 To meet the requirements of Rule 6.3(b) PCT, any independent claim should have been correctly cast in the two-part form.

3.2 Reference signs in parentheses should have been inserted in all claims in order to increase their intelligibility (Rule 6.2(b) PCT). This applies both to the preamble and to the characterizing portion.

3a

US Patent No. 5,999,518 describes a distributed telecommunications switching subsystem that is adapted to receive and distribute ATM data packets passed between a plurality of switching subsystems or channel

5   banks and a data packet switch. The solution includes the use of packet discard methods, which are performed at the Virtual Circuit connection (VC) layer. The US patent does not teach a way enabling any awareness of VC connections at the Virtual Path connection (VP) layer.

Claims:

1.   A method of handling ATM traffic comprising packets of AAL5 type composed of ATM cells, at a network node at VP-layer, the method comprising:

5   -   providing a database,

-     monitoring each of said cells incoming the node, and determining VC-layer and VP-layer parameters of the cell being monitored,

-     processing   information   on   said   determined
10   parameters,

-     registering the processed information concerning each of said cells in the database to form statistical data with respect to combinations of VC-layer and VP-layer parameters of the packets being handled at the node.

15

2.   The method according to Claim 1, wherein each of said packets belongs to a particular VCC (Virtual Channel Connection) and a particular VPC (Virtual Path Connection), and wherein each said packet comprises a plurality of ATM cells, all cells of the same packet carrying
20   the same value of VC-index (VCI) and the same value of VP-index (VPI), the method comprises:

determining said VC-layer and VP-layer parameters by determining VPI and VCI values of the cell;

registering the processed information per each of the monitored
25   cells in the database so as to allow judging about frequency of appearance of cells having various combinations of the VPI and VCI values, thereby enabling awareness of the network node about VCCs at the VP layer and frequency of their appearance in the ATM traffic being handled.

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26a

- detecting a new congestion event in the network while monitoring a cell belonging to a particular VCC and a particular VPC,

- analyzing information in the statistic database, and deciding based on the analysis, whether said particular VCC associated with said particular VPC is suitable for discarding,

- if yes, discarding cells of the VCC according to a selected discard policy,

- if not, performing the mechanism with respect to a new incoming cell.

AMENDED SHEET

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13.   The method according to Claim 12, comprising replacing a particular entry by reassigning it to another VCC if in said entry a reading of the "own cells" counter is significantly smaller than a reading of the "other cells" counter.

5   14.   The method according to Claim 6, further comprising indicating the status in the statistical database as follows:

Begin Of Packet – where the monitored VCC starts transferring a new packet, in case the previous ATM cell belonging to the VCC under monitoring carried an "End Of Packet" indication;

10   In Packet – where the monitored VCC is in the middle of the AAL5 packet transmission.

15.   The method according to Claim 14, further comprising indicating additional status options for informing whether the current VCC is already under a packet discard process; said status options being either

15   PD (partial discard) or FD (full discard).

16.   A method of packet discard at a network node at a VP-layer from ATM traffic comprising packets of AAL5 type composed of ATM cells; the method comprises:

- providing a database,

20   - monitoring each of said cells incoming the node, and determining VC-layer and VP-layer parameters of the cell being monitored,

- processing information on said determined parameters,

- registering the processed information concerning each of

25   said cells in the database to form statistical data with respect to combinations of VC-layer and VP-layer parameters of the packets being handled at the node,